CLAIMS

1. A method for identifying a compound as a candidate for a herbicide, comprising:

a) contacting a pectin esterase with a compound; and

b) detecting the presence and/or absence of binding between said compound and said pectin esterase, wherein binding indicates that said compound is a candidate for a herbicide.

2. The method of claim 1, wherein said pectin esterase is a plant pectin esterase.

3. The method of claim 2, wherein said pectin esterase is an *Arabidopsis* pectin esterase.

4. A method for determining whether a compound identified as a herbicide candidate by the method of claim 1 has herbicidal activity, comprising: contacting a plant or plant cells with said herbicide candidate and detecting the presence or absence of a decrease in growth or viability of said plant or plant cells.

5. A method for identifying a compound as a candidate for a herbicide, comprising:

a) contacting a compound with at least one polypeptide selected from the group consisting of: an amino acid sequence comprising at least ten consecutive amino acids of a plant pectin esterase, an amino acid sequence having at least 85% sequence identity with a plant pectin esterase, and an amino acid sequence having at least 80% sequence identity with a plant pectin esterase and at least 50% of the activity thereof; and

b) detecting the presence and/or absence of binding between said compound and said polypeptide, wherein binding indicates that said compound is a candidate for a herbicide.

6. A method for determining whether a compound identified as a herbicide candidate by the method of claim 5 has herbicidal activity, comprising:

contacting a plant or plant cells with said herbicide candidate and detecting the presence or absence of a decrease in growth or viability of said plant or plant cells.

7. A method for identifying a compound as a candidate for a herbicide, comprising:

a) contacting a UDP and pectin with pectin esterase, in the presence of water;

b) contacting said UDP and pectin with pectin esterase and a compound, in the presence of water;

c) contacting the methanol resulting from steps a) and b) with O_2 and alcohol oxidase;

d) contacting the hydrogen peroxide resulting from step c) with aldehyde, ABTS and peroxidase; and

e) determining the concentration of at least one of UDP, pectin, pectate, methanol, hydrogen peroxide and/or $ABTS^+$ after the contacting of any of steps a), b), c) and/or d).

8. The method of claim 7, wherein said pectin esterase is a plant pectin esterase.

9. The method of claim 8, wherein said pectin esterase is an *Arabidopsis* pectin esterase.

10. A method for identifying a compound as a candidate for a herbicide, comprising:

a) contacting, in the presence of water, a UDP and pectin with a polypeptide selected from the group consisting of: a polypeptide having at least 85% sequence identity with a plant pectin esterase, a polypeptide having at least 80% sequence identity with a plant pectin esterase and at least 50% of the activity thereof, and a polypeptide comprising at least 100 consecutive amino acids of a plant pectin esterase;

b) contacting, in the presence of water, said UDP and pectin with said polypeptide and said compound; and

c) contacting the methanol resulting from steps a) and b) with O_2 and alcohol oxidase;

d) contacting the hydrogen peroxide resulting from step c) with aldehyde, ABTS and peroxidase; and

e) determining the concentration of at least one of UDP, pectin, pectate, methanol, hydrogen peroxide and/or $ABTS^+$ after the contacting of any of steps a), b), c) and/or d).

11. A method for identifying a compound as a candidate for a herbicide, comprising:

a) measuring the expression of a pectin esterase in a plant or plant cell in the absence of a compound;

b) contacting a plant or plant cell with said compound and measuring the expression of said pectin esterase in said plant or plant cell;

c) comparing the expression of pectin esterase in steps (a) and (b).

12. The method of claim 11 wherein said plant or plant cell is an *Arabidopsis* plant or plant cell.

13. The method of claim 11, wherein the expression of pectin esterase is measured by detecting pectin esterase mRNA.

14. The method of claim 11, wherein the expression of pectin esterase is measured by detecting pectin esterase polypeptide.